SYSTEM AND METHOD FOR FORMING SINGLE-CRYSTAL DOMAINS USING CRYSTAL SEEDS

ABSTRACT OF THE INVENTION

Single-crystal devices and a method for forming semiconductor film single-crystal domains are provided. The method comprises: forming a substrate, such as glass or Si; forming an insulator film overlying the substrate; forming a single-crystal seed overlying the substrate and insulator; forming an amorphous film overlying the seed; annealing the amorphous film; and, forming a single-crystal domain in the film responsive to the single-crystal seed. The annealing technique can be (conventional) laser annealing, a laser induced lateral growth (LiLAC) process, or conventional furnace annealing. In some aspects, forming a single-crystal seed includes forming a nanowire or a self assembled monolayer (SAM). For example, a Si nanowire can be formed having a crystallographic orientation of <110> or <100>. When, the seed has a <100> crystallographic orientation, then an n-type TFT can be formed. Likewise, when a single-crystal seed has a <110> crystallographic orientation, a p-type TFT can be formed.